

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF SOUTH DAKOTA**

**IN THE MATTER OF THE APPLICATION BY ENGIE NORTH AMERICA, INC. FOR
A PERMIT FOR A WIND ENERGY FACILITY IN HYDE COUNTY, SOUTH
DAKOTA, FOR TRIPLE H WIND FARM**

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PRE-FILED DIRECT TESTIMONY OF TRICIA PELLERIN, SOUND AND ACOUSTICS,
ON BEHALF OF ENGIE NORTH AMERICA, INC.

February, ___ 2019

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1 **Q. Please state your name, employer and business address for the record.**

2 A. My name is Tricia Pellerin and I am a Senior Acoustic Engineer with Tetra Tech at 160
3 Federal Street, 3rd Floor, Boston MA, 02110.

4 **Q. Briefly describe your educational background.**

5 A. I have both Bachelor and Master of Engineering Science degrees from the University of
6 Western Ontario in London, Ontario.

7 **Q. Briefly describe your professional experience.**

8 A. I have approximately 14 years of environmental consulting experience, focusing on
9 acoustic analysis. I have supported the permitting of more than 40 wind energy facilities, both
10 onshore and offshore, in more than 20 states. My work includes conducting acoustic studies
11 required to adhere to the applicable noise requirements, such as completing baseline sound
12 surveys, acoustic modeling analysis, and post-construction sound surveys.

13 **Q. Have you attached a resume or CV.**

14 A. Yes, my resume is attached.

15 **Q. Have you previously submitted or prepared testimony in this proceeding in South
16 Dakota?**

17 A. No, I have not.

18 **Q. What is the purpose of your direct testimony?**

19 A. My testimony is to discuss the acoustic modeling used to design the project, discuss its
20 anticipated impacts on residents in the project area, and discuss mitigation efforts made in
21 design.

22 **Q. Which sections of the application are you responsible for?**

23 A. 11.3, Acoustics.

24 **Q. Did the project model its expected acoustic impacts and if so, what were the results?**

25 A. A Pre-Construction Wind Turbine Acoustic Assessment was conducted for the Project in
26 December 2018 and is included in Appendix G. The results of the acoustic assessment show that
27 the Project will comply with the Hyde County 45-A-weighted decibel (dBA) limit at all
28 receptors, except for three participating landowner properties which may periodically experience
29 sound levels above the noise threshold criteria.

30 **Q. What are the Hyde County Ordinances?**

31 A. Hyde County proposed regulations for wind energy facilities under Zoning Ordinance
32 Section 9-104-A-18 limiting sounds levels to 45 dBA at the perimeter of occupied residences
33 existing at the time the permit application unless a signed waiver is obtained from the landowner
34 or the land is leased. The noise level may be exceeded during short-term events such as utility
35 outages or wind storms.

36 Sound levels resulting from the Project at all identified receptors located in the vicinity of
37 the Project were assessed against the 45 dBA limit to determine whether compliance was
38 achieved. The Hyde County Zoning Ordinance noise limit is absolute and independent of the
39 existing acoustic environment; therefore, a baseline sound survey was not required to assess
40 conformity.

41 **Q. Are there acoustical impacts from construction?**

42 A. Potential noise associated with construction and decommissioning of the Project includes
43 site clearing, grading, foundation work and wind turbine generator installation. While most
44 heavy construction work is anticipated to occur during daylight hours, some construction
45 operations may be conducted outside of normal working hours. In these cases, the necessary
46 construction efforts generally require activities that must be completed in their entirety once

47 initiated (i.e., pouring concrete). The list of construction equipment that may be used on the
48 Project and estimates of near and far sound source levels are presented in Table 11-1.

49 **Q. Will the project undertake efforts to mitigate impacts from construction activity?**

50 A. All reasonable efforts will be made to minimize the impact of noise resulting from
51 construction activities. Sounds generated by construction activities are typically exempt from
52 state and local noise oversight if they occur within weekday, daytime periods. All construction
53 and decommissioning related noise producing activities will be undertaken as to comply with
54 applicable permit requirements and applicable ordinances.

55 **Q. What about impacts from operation of the wind farm?**

56 A. When in motion, the wind turbines generate sound primarily from aerodynamic flow
57 across and around the blades. Secondary contributors to turbine noise are associated with the
58 mechanical and electrical equipment within the nacelle including gearboxes, motors, cooling
59 systems and pumps. Sound level is strongly dependent on the speed of the tip of the blade, the
60 design of the blade and on atmospheric conditions such as the degree of turbulence. Blade noise
61 increases with wind speed until full rated electrical power is achieved. However, it is also
62 important to recognize that, as wind speed increases, the ambient sound level will generally
63 increase, which will aid in masking sound produced by wind turbines.

64 **Q. How did you model the project acoustics?**

65 A. Sound propagation modeling was conducted using the CadnaA (Computer-Aided Noise
66 Abatement) program (version 2018 MR1), a comprehensive 3-dimensional acoustic modeling
67 computer simulation software, with calculations made in accordance with the International
68 Organization for Standardization (ISO) Standard 9613-2 “Attenuation of Sound during
69 Propagation Outdoors.” Further information is found in Section 11.3.2.3 of the application.

70 **Q. What were the results?**

71 A. The maximum calculated noise level, based on assumptions incorporated into the Cadna-
72 A model and the turbine layout, resulted in a received sound level of 49 dBA at one NSR under
73 maximum rotational wind turbine operation during both moderate downwind and anomalous
74 meteorological conditions. In addition, two other NSRs have the potential to exceed the 45 dBA
75 noise limit threshold as mandated under the Hyde County Zoning Ordinance (Table 5 in
76 Appendix G). One NSR is expected to exceed the 45 dBA noise limit under maximum rotational
77 wind turbine operation during both moderate downwind and anomalous meteorological
78 conditions, while the other NSR is only expected to exceed the limit under anomalous
79 meteorological conditions. As all three NSRs involve landowners participating in the project, no
80 written waiver is required. All other NSRs were shown to comply with the 45 dBA limit. Lastly,
81 modeling results also showed that all NSRs were anticipated to remain below the 45 dBA limit at
82 cut-in wind speeds.

83 **Q. Are there mitigation measures to implement in either the construction or operation**
84 **of the project?**

85 A. Triple H does not anticipate that noise mitigation will be necessary. However, Triple H
86 will establish a process for documenting, investigating and resolving Project-related noise
87 complaints. With respect to the short-term construction-related noise, mitigation measures will
88 include maintaining all equipment in good working order in accordance with manufacturer
89 specifications (e.g., suitable mufflers and/or air-inlet silencers should be installed on all internal
90 combustion engines and certain compressor components); and enforcing speed limits for all
91 vehicles and construction equipment traveling within and around the Project Area.

92

93

94 Dated this 6 day of February, 2019.

95 *Tricia Pellerin* _____

96 Tricia Pellerin, Acoustics – Tetra Tech